



Application of the US decision support tool for materials and waste management

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Abstract:

The US Environmental Protection Agency (US EPA) launched the Resource Conservation Challenge (RCC) in 2002 to help reduce waste and move towards more sustainable resource consumption. The objective of the RCC is to help communities, industries, and the public think in terms of materials management rather than waste disposal. Reducing cost, finding more efficient and effective strategies to manage municipal waste, and thinking in terms of materials management requires a holistic approach that considers life-cycle environmental tradeoffs. The US EPA's National Risk Management Research Laboratory has led the development of a municipal solid waste decision support tool (MSW-DST). The computer software can be used to calculate life-cycle environmental tradeoffs and full costs of different waste management or materials recovery programs. The environmental methodology is based on the use of life-cycle assessment and the cost methodology is based on the use of full-cost accounting. Life-cycle inventory (LCI) environmental impacts and costs are calculated from the point of collection, handling, transport, treatment, and disposal. For any materials that are recovered for recycling, offsets are calculated to reflect potential emissions savings from use of virgin materials. The use of the MSW-DST provides a standardized format and consistent basis to compare alternatives. This paper provides an illustration of how the MSW-DST can be used by evaluating ten management strategies for a hypothetical medium-sized community to compare the life-cycle environmental and cost tradeoffs. The LCI results from the MSW-DST are then used as inputs into another US EPA tool, the Tool for the reduction and assessment of chemical and other environmental impacts, to convert the LCI results into impact indicators. The goal of this paper is to demonstrate how the MSW-DST can be used to identify and balance multiple criteria (costs and environmental impacts) when evaluating options for materials and waste management. This type of approach is needed in identifying strategies that lead to reduced waste and more sustainable resource consumption. This helps to meet the goals established in the US EPA's Resource Conservation Challenge.

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Resource Description

Exposure : ☐

weather or climate related pathway by which climate change affects health

Air Pollution, Other Exposure, Unspecified Exposure

Air Pollution: Particulate Matter, Other Air Pollution

Air Pollution (other): SO_x; NO_x

Geographic Feature: ☒

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☒

resource focuses on specific location

United States

Health Co-Benefit/Co-Harm (Adaption/Mitigation): ☒

specification of beneficial or harmful impacts to health resulting from efforts to reduce or cope with greenhouse gases

A focus of content

Health Impact: ☒

specification of health effect or disease related to climate change exposure

Cancer, Other Health Impact

Other Health Impact: toxicity

Mitigation/Adaptation: ☒

mitigation or adaptation strategy is a focus of resource

Mitigation

Model/Methodology: ☒

type of model used or methodology development is a focus of resource

Cost/Economic, Outcome Change Prediction, Other Projection Model/Methodology

Other Projection Model/Methodology: municipal solid waste decision support tool MSW-DST; Full-accounting approach (FCA); Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI)

Resource Type: ☒

format or standard characteristic of resource

Research Article, Research Article

Timescale: ☒

time period studied

Short-Term (